

Trans-Iranian Railway

Conservation of Monuments and landscape

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Brief history and description

- The 1394-km-long Trans Iranian Railway, TIR, connects the Caspian Sea in the north to the Persian Gulf and Oman Sea in the south. It links the Iranian ports of Bandar-e Torkaman in the northeast to Bandar-e Imam Khomeini in the southwest. The TIR became fully operational in 1938.
- The topography of Iran includes two major mountain ranges stretching across the country. These are continuations of the major Himalayan range. There also exists a large number of rivers, highlands, forests, seashores and plains. When the decision was made in 1925 to establish a national railway system, and to build a north-south line across the mountains, the scale of this Iranian geomorphology became a defining factor.

TIR, Connects the Caspian Sea in the north to the Persian Gulf and Oman Sea in the south



Location of Provinces



Lorestan Route

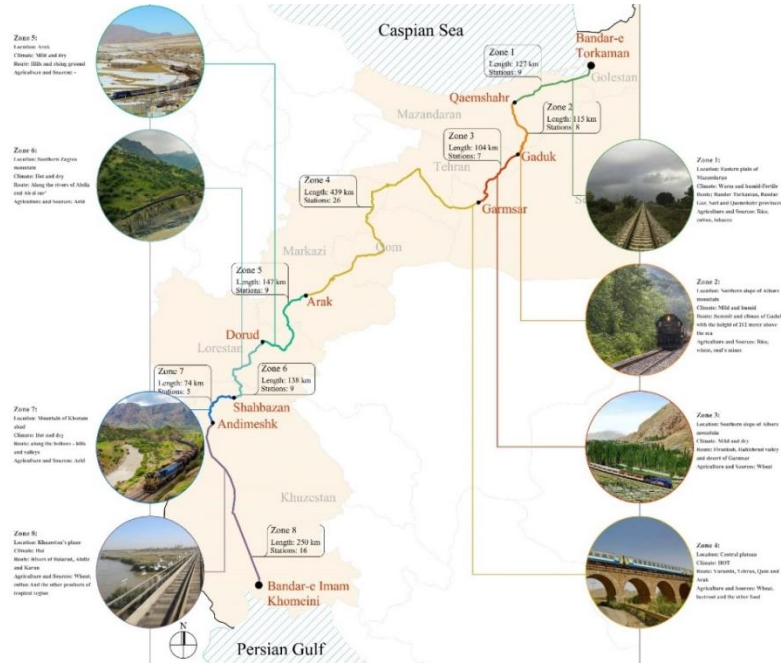
TIR as a Road Heritage

- Historically, several trade routes including the Silk Road and the Spice Route which linked the continents of Asia, Africa and Europe passed through Iran. As such, construction of the TIR in the early 20th century puts emphasis on the key role of the region in global communications in terms of cultural, commercial, social and even political relations.
- It has led to the propagation of trade and the sharing of diverse rites, ceremonies and beliefs among various regions in the early twentieth century, especially in western and central Asia.

Significance and Values

→ Because of moving across, over or through deep valleys, high peaks and fast-flowing rivers in various geographical regions with different climates (including temperate, plain, mountainous and desert), the construction project faced many technical complications, especially in the Alborz and Zagros mountain ranges. This required special engineering arrangements as well as designing and building of several tunnels, viaducts, retaining walls, minor roads, Buildings (in their original native pattern) and huge engineering structures. On the whole, the rail links pass through eight geographical regions and the above-said climates, which is a highly exceptional route. Fortunately, after more than eight decades of using this line, most of them have remained intact.

The Rail links pass through eight geographical regions with different climates



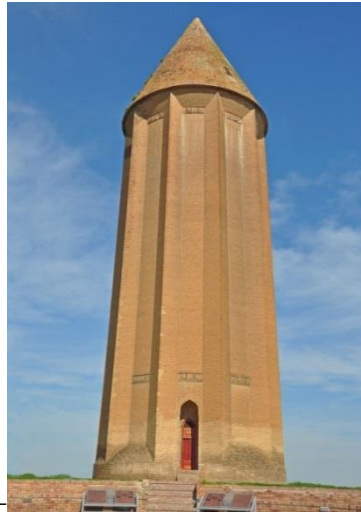
Significance and Values

→ Since its inauguration, TIR has continued to play a key role in the rural and urban life of the region. At the same time, it has continued to be a crucial factor in trade and cultural transactions between the region and other near and far countries. It has served as the turning point for all-embracing developments in the region covering a wide spectrum of various economic, political, commercial, social, cultural, and later touristic aspects at a critical juncture of the contemporary history of the world.



Landscape diversity and unique values

→ Cultural and Natural Heritage in Buffer and landscape zones

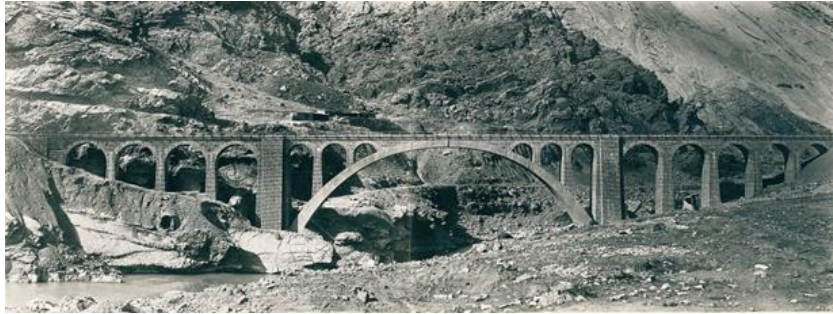


Architectural values:

Different stations in different climates are built in line with the local architectural tradition



Engineering values

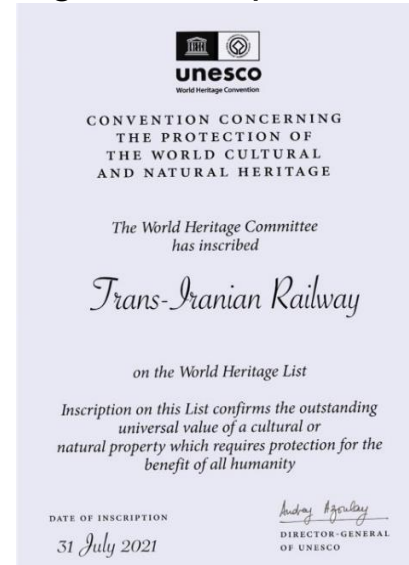
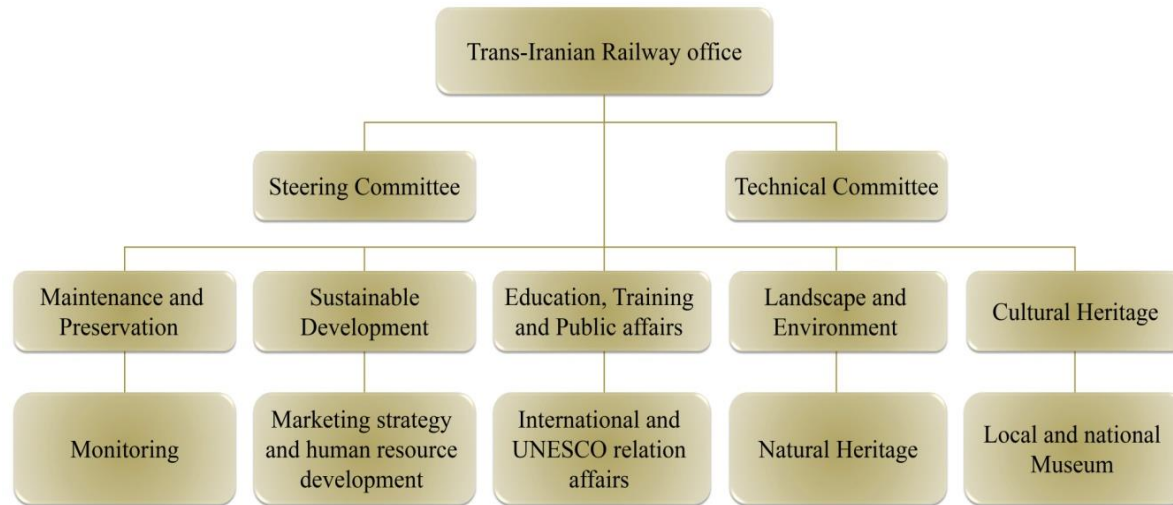


Inclusion in the World Heritage List in line with criteria II and IV

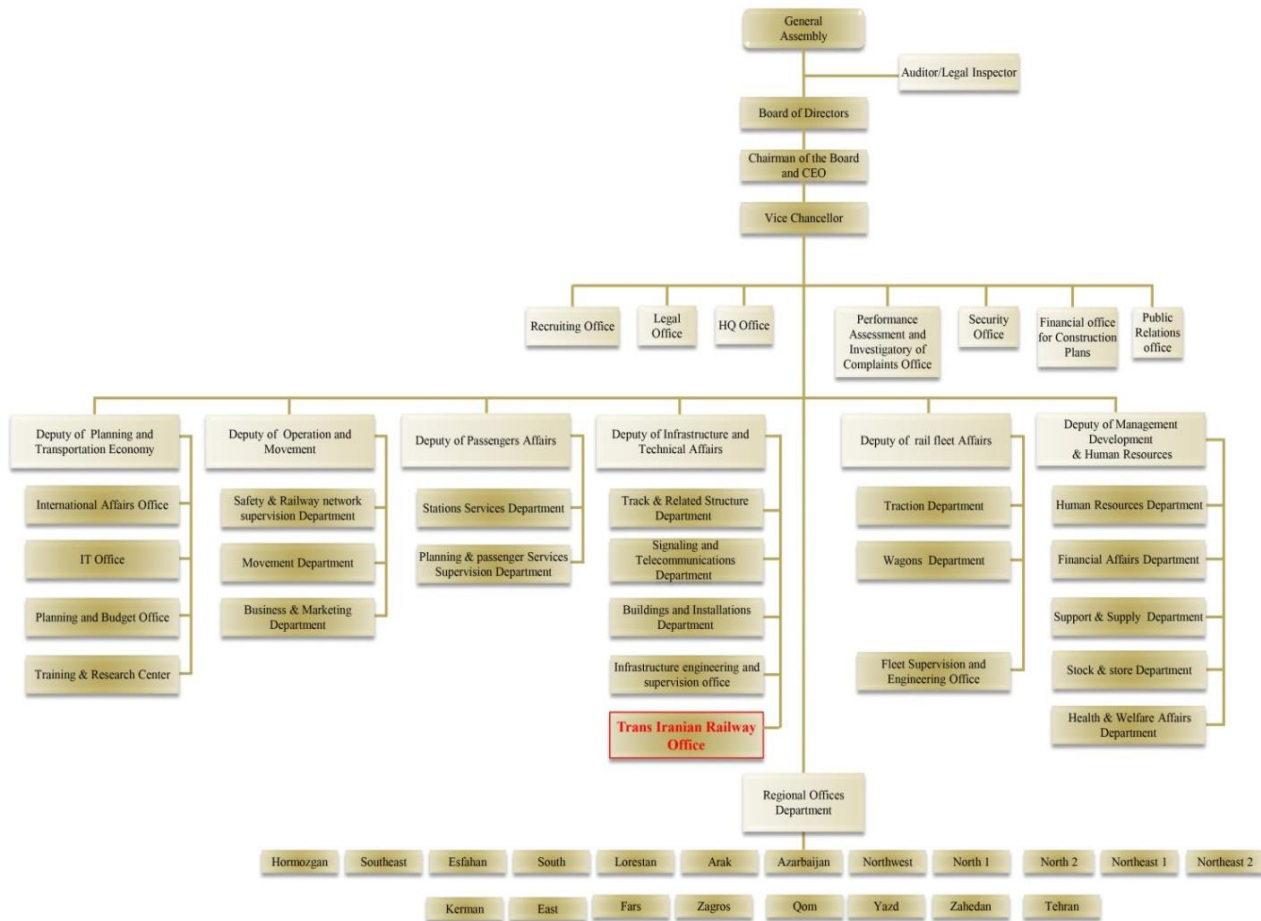
- Today, the TIR remains a busy mainline railway operating almost in full capacity with passenger and freight trains. This continued use reflects its success as a railway and is part of its value. Despite earthquakes, all the original engineering features continue in use, reflecting the outstanding quality of their design and construction. The rich architectural legacy of 89 station buildings has also survived with remarkable authenticity and integrity. The magnificent Tehran Station befits a capital city, as a world scale railway, it has outstanding values.
- The TIR was included in the World Heritage List in 2022 due to its outstanding universal values and preservation of its authenticity and integrity in line with criteria II and IV. To follow, various aspects of conservation and management are briefly mentioned.

Conservation and Management

- For integrated management and conservation, a special management structure has been defined for the TIR, enabling the implementation of all aspects related to research, monitoring, maintenance, restoration, conservation, capacity building and interpretation.



The organizational structure of the TIR



Trans-Iranian Railway Base(Office)

→ The type of activities conducted by the Infrastructure engineering and supervision office has a direct relationship with the Trans-Iranian Railway Base. Aimed at the conservation and management of outstanding values of the property and in line with approved national and international conventions and bylaws, this Base, in addition to supervision and monitoring of all affairs related to the Trans-Iranian Railway, acts with added emphasis on cultural heritage issues such as: introduction, education and tourism as well as issues related to the cultural heritage. Its tasks have been defined in the Coordination office and include: preparing and preserving the archives, preparing relevant reports and necessary coordination.

Protection and conservation

- Protecting the Trans Iranian Railway (TIR) in its capacity as an industrial living heritage differs from the conservation of a historical site. Dynamic protection together with continuity of values and maintaining authenticity and integrity of the property is of prime importance. To achieve this goal, services offered to the passengers follow modern systems and methods, while the technical sections linked with the trains' passage and security are managed under a dynamic conservation programme.
- The bridges, tunnels, historical buildings of the stations and other relevant builds located in the property follow technical regulations set by the Iranian Ministry of Cultural Heritage, Tourism and Handicrafts. As for the buffer, the rules applied to its protection are set by the Islamic Republic of Iran Railway, the Ministry of Roads and Urban Development, the Ministry of Cultural Heritage, Tourism and Handicrafts, the Forest, Range and Watershed Management Organization and the Department of Environment.
- Some aspects of protection and conservation will be further considered in the text.

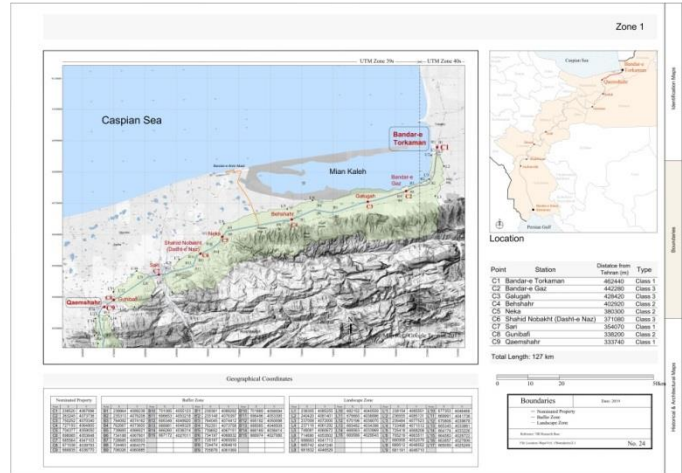
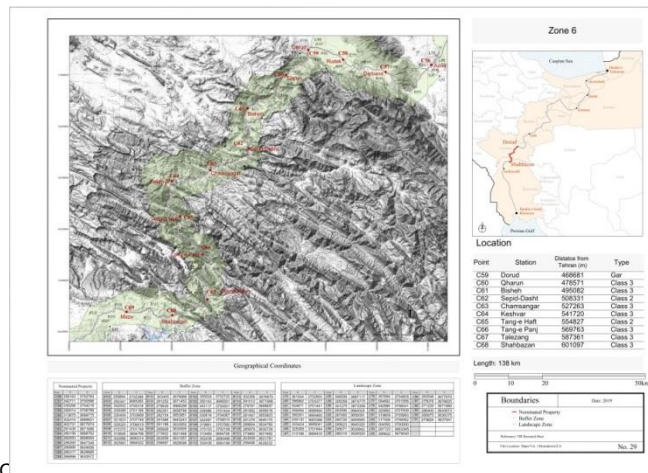
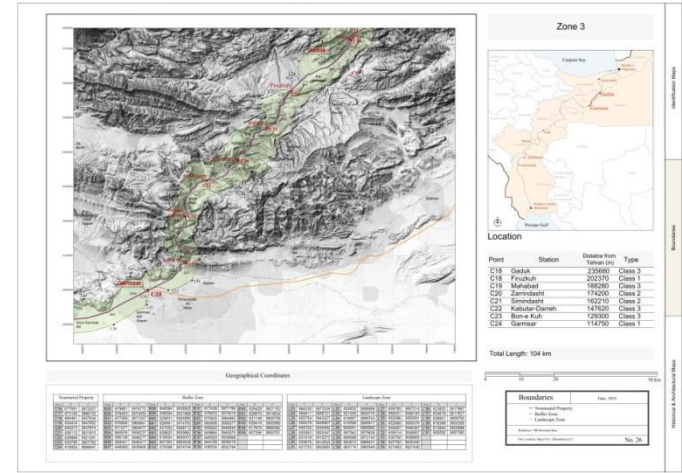
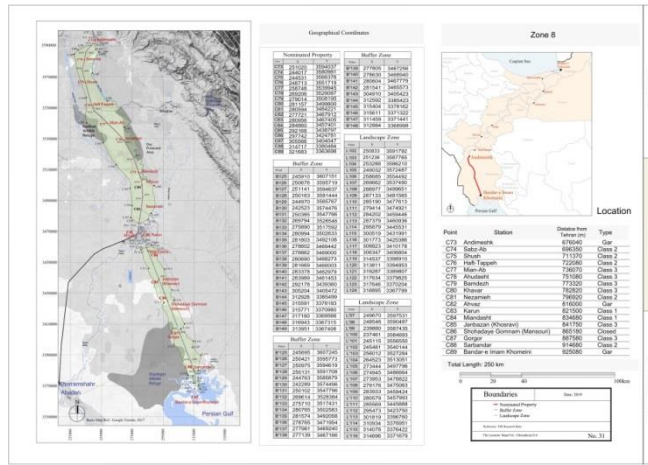
Legal protection

- The buffer and property of the TIR World Heritage Site follow diverse legal protection regulations. This is because in addition to the technical buffer of the TIR, which enjoys a good status of conservation since its inception, a buffer area in the form of a landscape comprised of all historical and natural sites is considered for the TIR. The latter is important due to the significance attached to the spectators' vision corridor when traveling by train. The importance of the natural and historical landscape of the TIR also lies in the need to maintain its historical heritage and natural values, to retain the integrity of the property as a whole. To achieve this goal, various national entities including the Iranian Ministry of Cultural Heritage, Tourism and Handicrafts, the Ministry of Road and Urban Development, the Forest, Range and Watershed Management Organization, and the Department of Environment, all with regulations older than a century, cooperate with the TIR.

Observing national and universal laws, regulations and constitutions for the protection and conservation of the TIR

- According to the legal system of Iran, the railway company (Base of TIR) has responsibility for protection, conservation, repair and maintenance of the Trans-Iranian Railway. Various rules, guidelines and regulations of the Islamic Republic of Iran Railway support this property. From a technical aspect, from the very beginning of construction, the Trans-Iranian railway is supported by the protective and technical rights of Islamic Republic of Iran Railway. Considering that the Trans-Iranian railway covers a long distance of the Iranian environment and geographical points and according to its outstanding historical, natural, social, technical and technological values, is supported by other protective measures besides those adopted by the Railway Company.
- From a cultural and historical values point of view, the TIR is also protected by the rules and regulations applied to national cultural heritage including historical monuments.
- In the geographical and natural category, considering that the TIR passes through outstanding natural areas of Iran, such as national parks or protected areas, it is thus also under the protection of rights and laws of the Forest, Range and Watershed Management Organization and the Iranian Department of Environment.
- Also, given that the railway crosses from different cities and villages, the Ministry of Road and Urban Development also has protective laws to preserve the Railway's social interactions and cultural values.

→ Some Boundaries of the Property, on Buffer and landscape zones and related legislation



Technical Conservation

→ Inventorying, documentation and monitoring are necessary for the pathology and for analysing the wellbeing of the various structures of the TIR. As such, inventorying, documentation and monitoring are of top priority in the conservation of the TIR. Thus, they are carried out in various forms along the TIR, at different times and places. Supervision over the status of integrity and authenticity of the TIR is carried out based on the documents thus provided as well as field visits. A multidisciplinary committee is in charge of technical decision-making and related consultation activities.

Inventorying and Documentation

→ There exists a large list and document on the machinery, equipment, station information, railroad items and objects at the archives of the Islamic Republic of Iran Railway and the Trans-Iranian Railway Base (office).

→ Inventory forms are listed and archived in the following categories:

- Machinery (Locomotives, Machines, tools and rolling stock)
- Architecture (the railway stations, workshops and other related buildings)
- Documents (historical archives and information)
- Objects (Related items)

Some examples of inventory and documentation(Machinery and Buildings)

Identification form for rail mechanized machinery and similar equipment	
Form Completion Date: march/2016	Regional Railway Administration
Machine or Equipment Name: Cabin Crane	
Model and Year of Construction: OBW-10-1993	
Operating Instructions: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Maintenance Instructions: Yes <input type="checkbox"/> No <input type="checkbox"/> (If applicable)	
Current status: in operation <input type="checkbox"/> needs restoration <input type="checkbox"/> healthy but old <input type="checkbox"/>	
Conservation and maintenance activities:	
If is necessary to repair, cost forecast (million Rials)	
	

ملاحظات سازماندهی ایستگاه راه آهن پل سفید




ساختمان اصلی ایستگاه پل سفید
طبقه همکف سالن مسافری
جدید طرح

ساختمان اصلی ایستگاه پل سفید
طبقه همکف دوم
جدید طرح

شماره	Proj.	Type	City	نام اثر ملی	Dip.	Region	Not.	تاریخچه
۵۵	۳۳	IL	POS	معماری و شهرسازی	A.T.C	۳	۵۵	سازمان راه آهن

باسمه تعالی
فرم شناسایی ارقام تاریخی

نام: ساختمان مسکونی - A پنکله
تاریخ احداث یا قدمت تقریبی بنا یا سازه: حدوداً سال ۱۳۱۵
متر از
عرصه: ۱۹۰۷ مترمربع - عیان: ۵۹۰/۵ مترمربع
تعداد طبقات: ۱
تعداد اتاق ها: ۴
کاربری: مسکونی
نوع نمای بنا: آجری
نوع سازه بنا: دیوار باربر
شماره پلاک ثبتی: ۷
ملاحظات:



ردیف	عنوان ساختمان	عملکردهای ساختمان	فضاها	مصالح داخلی	نوع بازشو	لما مصالح
۲	نمازخانه					سایه سیمان
۳	سرویس‌های بهداشتی					سایه سنگ
۴	ساختمان پلیس					سنگ مالتون
۵	سالن ورزشی					سایه آلود
۶	خوابگاه لوکوموتورانان					سایه آلود
۷	ساختمان پانل					سایه آلود
۸	ساختمان مخازن آب و ارتباطات					سایه آلود

تاریخ:	Rev.	Rep.no	Dep.	نام کارشناس:	City	Type	Proj.	مختصات:
مرداد ۱۳۹۷	۰۵	۰۳	ARC	معماری و شهرسازی	POS	R	۷۷	۱۳۰

۸- تکمیل و تهیه شناسنامه معماری کلیه ابنیه موجود در ایستگاه

ساختمان‌های موجود در ایستگاه راه‌آهن نوساز به مجوز اخذ شده از مسئولین برناشت و عکسبرداری شده است و در مراحل بعدی هم در قالب فیزیکی مسئله، هم از نظر کیفیت فضای لازم برای کاربری در نظر گرفته شده برای آن، بررسی شده است. شایان ذکر است موقعیت هر یک از ساختمانهای ایستگاه از طریق کدگذاری روی عکس هوایی محدوده آن، در بخش ۵-۱ فصل اول (شکل ۹ و جدول ۴)، با عنوان معرفی ایستگاه و موقعیت شهری آورده شده است. مجموعه نتایج برناشت‌ها و بررسی‌های میدانی صورت گرفته، در قالب موارد ذیل دسته‌بندی شده است:

جدول شماره (۱۱) مجموعه نتایج برناشت‌ها و بررسی‌های میدانی

ردیف	عنوان ساختمان	عملکردهای ساختمان	فضاها	مصالح داخلی			نوع بازشو	لما مصالح
				کف	دیوار	سقف		
۱	ساختمان اصلی ایستگاه	سالن مسافری، بخش باران، تبهه بسته	سالن مسافری	سنگ مرمرینه	آهک سیمانی	آهک سیمانی	آهک سیمانی	سنگ مرمرینه
				آهک سیمانی	آهک سیمانی	آهک سیمانی	آهک سیمانی	آهک سیمانی
				آهک سیمانی	آهک سیمانی	آهک سیمانی	آهک سیمانی	آهک سیمانی
				آهک سیمانی	آهک سیمانی	آهک سیمانی	آهک سیمانی	آهک سیمانی
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تاریخ:	Rev.	Rep.no	Dep.	نام کارشناس:	City	Type	Proj.	مختصات:
مرداد ۱۳۹۷	۰۵	۰۲	ARC	معماری و شهرسازی	POS	R	۷۷	۱۳۰

Example of Inventory form of Stations

Some examples of inventory and documentation(Objects and Documents)

فرم شناسایی ائیمه و سازه های تاریخی راه آهن - ناحیه جنوب


1- محل و نام بنا یا سازه : پل سیاه کارون	2- تاریخ احداث یا قدمت تقریبی بنا یا سازه : حدوداً سال 1308
3- متر از سطح دریا: 1050 متر، عرض 6 متر و ارتفاع 7 متر از روی قنداسین پستی تا زیر شناسی	4- تعداد دهاته : دارای 51 دهاته و طول هر دهاته 20 متر
5- تعداد اطاقی ها : _____	6- کاربری : _____
7- توغ تعاری بنا : _____	8- شماره پلاک ثبتی : _____
9- توغ سازه بنا : از توغ شناسی فلزی با پایه های خربای پستی و قنداسین پستی مسلح و با اتصالات پرسی	10- شرح مختصری از وضعیت بنا یا سازه و رویداد های تاریخی مرتبط - حداقل 4 تصویر از زوایای مختلف : پل سیاه کارون واقع در اداره کل راه آهن جنوب اهواز- کارون کیلومتر 500-817 ای 550-818 بطول 1050 متر، عرض 6 متر و ارتفاع 7 متر از روی قنداسین پستی تا زیر شناسی ، دارای 51 دهاته که طول هر دهاته 20 متر، از توغ شناسی فلزی با پایه های خربای فلزی و قنداسین پستی مسلح و با اتصالات پرسی ، روسازی پل از توغ تراورس چوبی و ریل UIC60 و U33 بوده که در حال پیماسی و تبدیل به ریل UIC60 می باشد .






بسته عالی
فرم شناسایی ائیمه فرش

نام و ردیف	ردیف سوره
محل نگهداری	محل نگهداری
تاریخ ساخت	تاریخ ساخت
جنس ائیمه	جنس ائیمه
محل تاریخچه	محل تاریخچه
محل نگهداری	محل نگهداری
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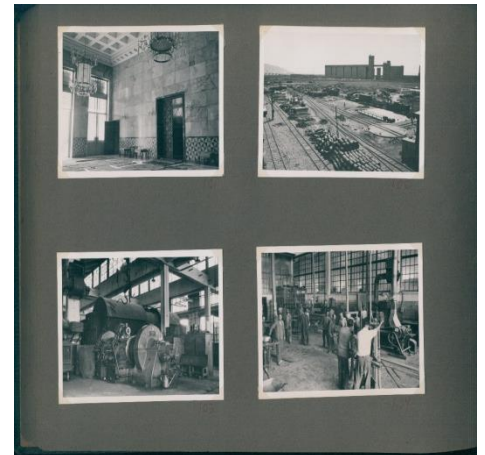
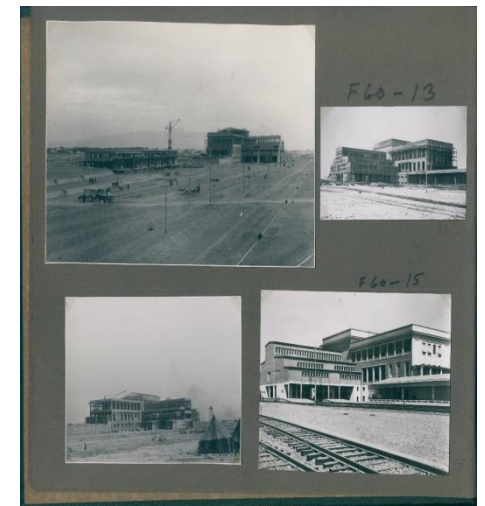


فرم شناسایی ائیمه

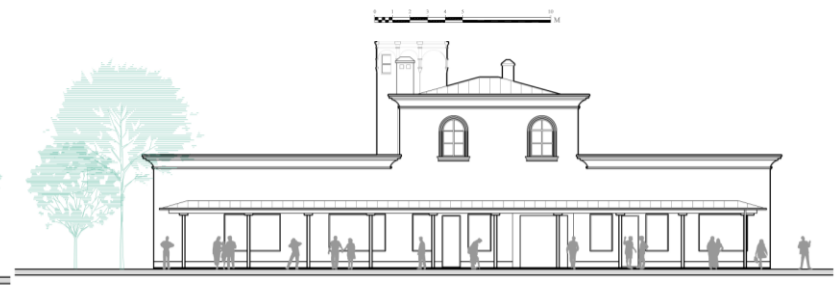
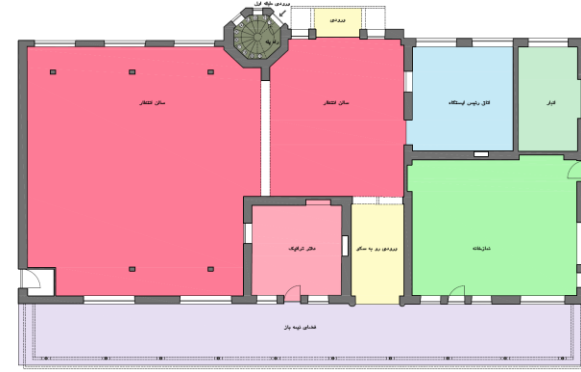
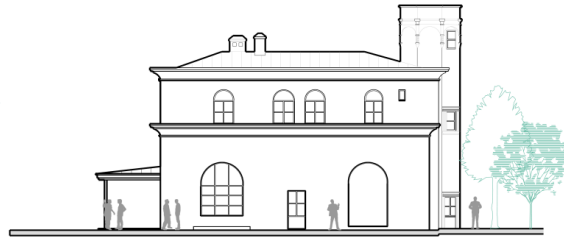
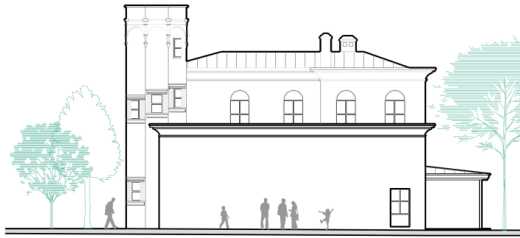
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محل نگهداری	محل نگهداری
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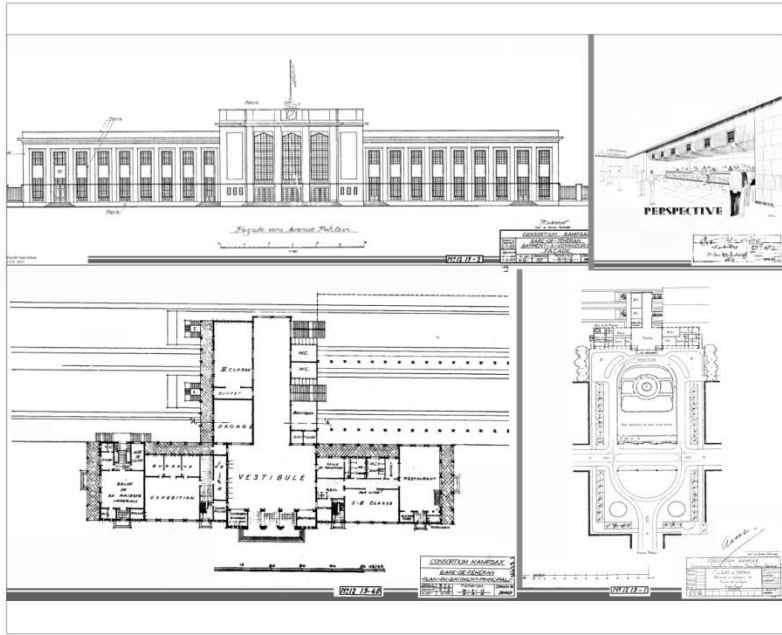
Examples of a Railway Museum in a historical building and an open space museum



Example of Documentation



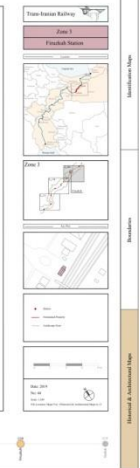
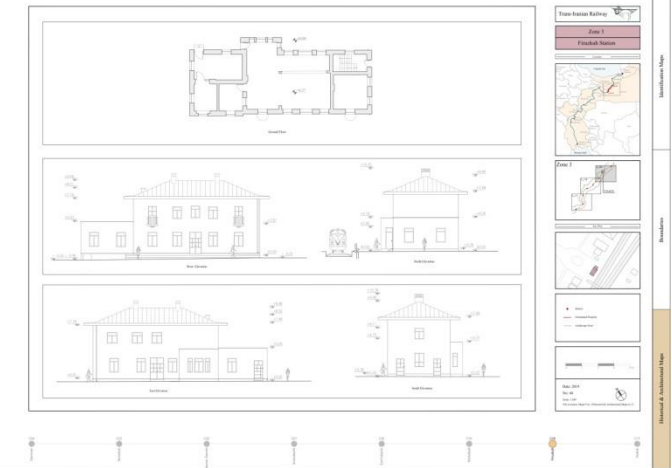
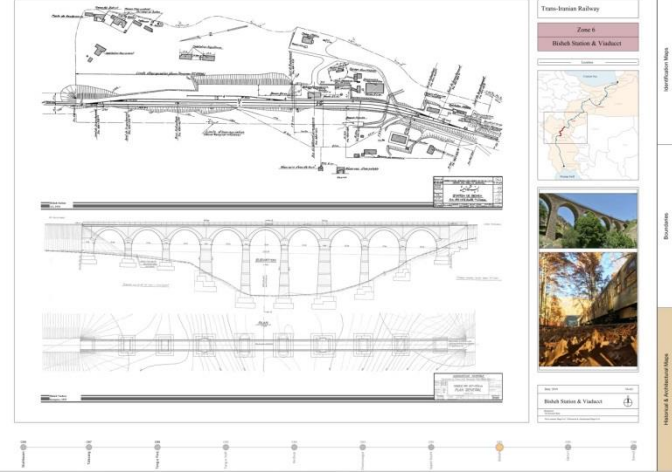
Examples of Documentation



Identification Maps

Boundaries

Historical & Architectural Maps



Monitoring

- The Trans-Iranian Railway Base is in charge of monitoring and is entrusted with the task of seeing to the maintenance of TIR in the IR of Iran Railway Company. The various influential factors such as controlling the architectural conditions, technical control, environmental and other Trans-Iranian railway-related factors are among the assessment and monitoring parameters. Key elements considered in the Trans-Iranian railway assessment are based on cultural-historical and technological values. An integrated monitoring system controls all the railway activities. Some key factors affecting maintenance efforts are as follows:
- Preservation and maintaining engineering structures (bridges, tunnels, railway and tracks and protective structures), fleet (freight, passenger and locomotive), buildings (stations and facilities) railway infrastructures, publicity and training, tourism, natural elements and environment.

Building Monitoring (stations and facilities)

→ Like technical structures, buildings are also exposed to periodic and visual inspection. If inspections reveal defects or failure in the buildings such as cracks, settlement, breakdown of utilities, safety equipment, vulnerability to earthquake, malformation in the appearance etc. necessary counter-measures would be taken. Making use of advanced technology, the given building is simulated and the cheapest and most efficient solutions for it are selected.

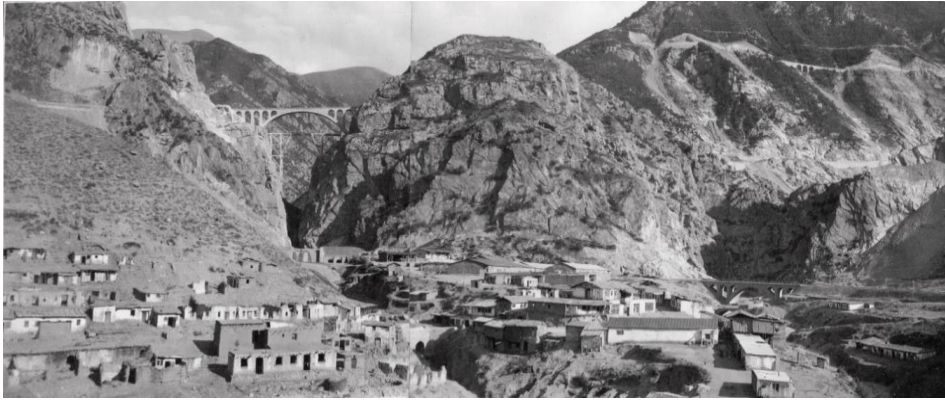
→ Based on the identification of the influential factors, a number of indicators that are monitored by responsible authorities are identified for the maintenance of various elements along the route of the railway. Here are two examples:

→ **Example for Buildings Monitoring Indicators.**

Category		Indicator	Method	Interval	Entity in charge
Conservation and Maintenance	Buildings	Stations	Field visit	Weekly	Buildings and Installations Department – Deputy of Passengers Affairs
				Monthly	
	Resting areas	Monitoring the appearance and cleanliness	Field visit	Weekly	Regional Offices Department-Buildings and Installations Department
		Safety and structure		Monthly	

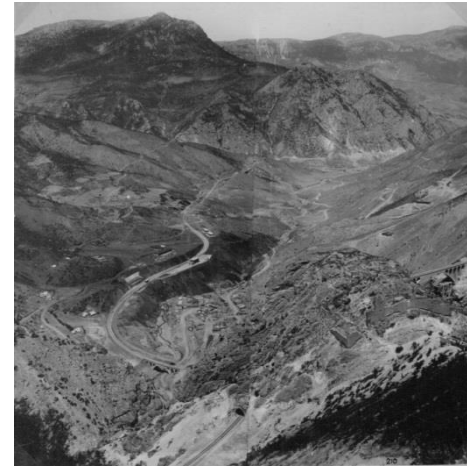
Example of monitoring indicators related to engineering structures

Category		Indicator	Method	Interval	Entity in charge	
Maintenance	Engineering Structures	Bridges	Monitoring the foundations, walls of abutments, pillars, retaining walls, decks and piers, pavements, insulations, drainage and bridge supports	Field visits -Test Report -Sensor Based Measurement Systems	Depending on the type of visit and other parameters, inspections are either: 1- Weekly 2- Monthly 3-Yearly	Track and Related Technical Structure Department- Regional Offices Department
	Tunnels	Monitoring tunnel lining , Anchors, Recess, Tunnel Portals, Tunnel Fixtures and Fittings, drainage systems	Field visits, Test Report -Sensor Based Measurement Systems	Depending on the type of visit and other parameters, inspections are either: 1- Weekly 2- Monthly 3-Yearly	Track and Related Technical Structure Department- Regional Offices Department	
	Railway Tracks	Monitoring tracks, ballast, sleepers, etc.	Field visits, machineries	Daily-weekly	Track and Related Technical Structure Department- Regional Offices Department	
	Protective Structures	Inspecting retaining walls and embankments	Field visits, machineries	Monthly	Track and Related Technical Structure Department- Regional Offices Department	



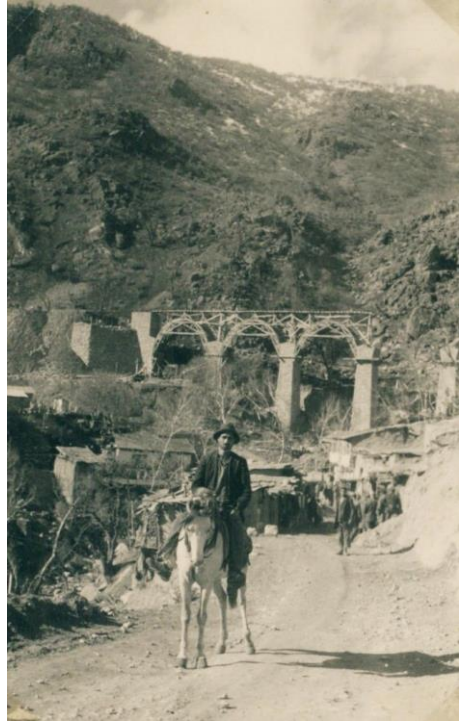
Monitoring: Veresk, Up: 1934- Down: 2017

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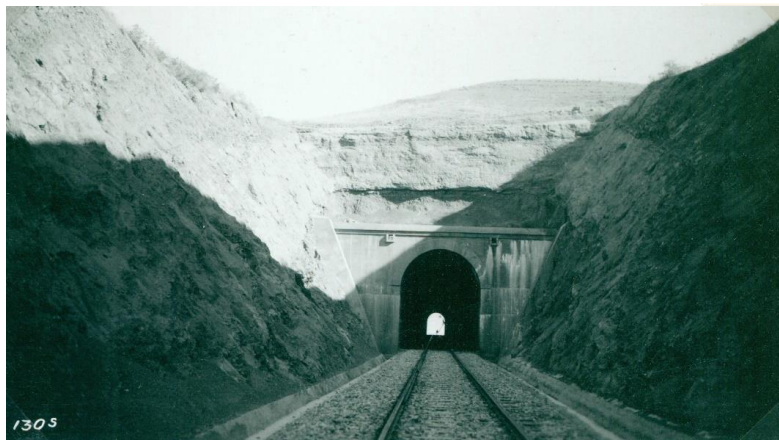
Monitoring: Tehran Station, Up: 1934-1936 - Down: 2017



Bisheh Bridge, Up: 1934- Down: 2017



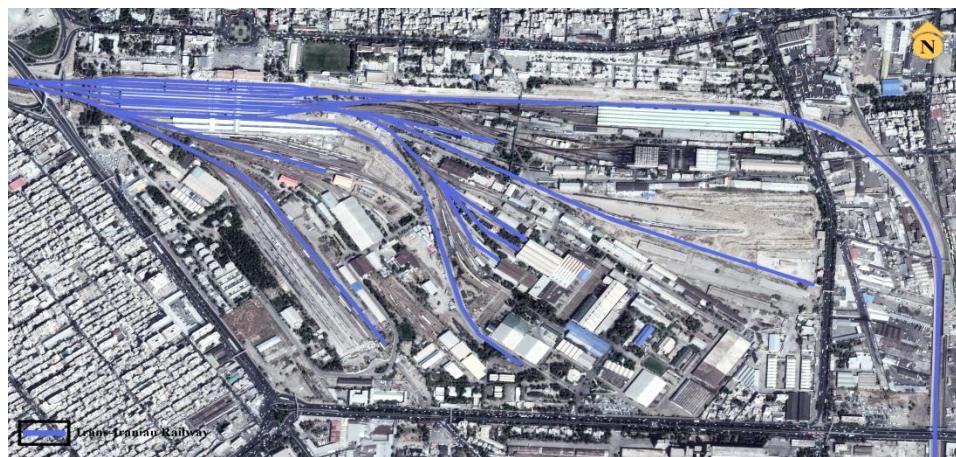
Saleh Hamid Bridge, Up: 1934- Down: 2017



First Tunnel of South Route, Up: 1934- Down: 2017
RAILWAY HERITAGE PRESERVATION CONFERENCE, ETH Zurich Zentrum, 23 – 25 June 2022

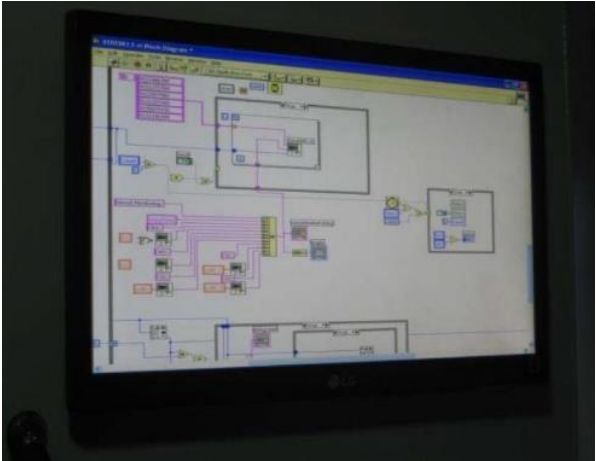
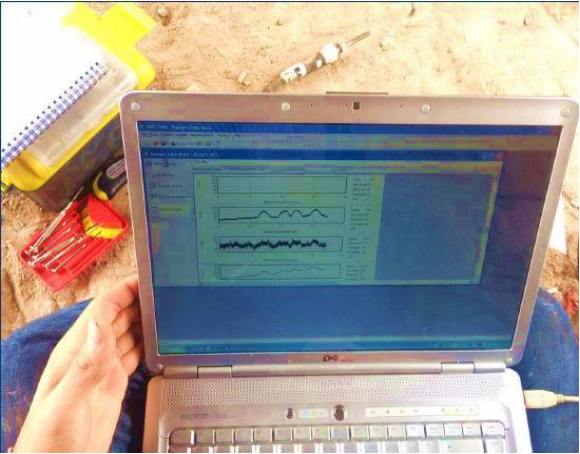


Mazu Station, Up: 1934- Down: 2017



Aerial Photo of Tehran Station, 1966 and 2017

Utilization of Modern Tools for Monitoring Bridges



An Example of a Reinforced Bridge

It is restored by concrete Jacketing in order to reinforce it against earthquakes. The method applied in the restoration of the bridge is such that the original structure of the bridge and interventions undertaken are identifiable.



An Example of Restoration and change of use.

One of the abandoned spaces of Arak station that now functions as a restaurant.



Suggestions

Upgrading Management Plan.

Developing a Crisis Management Plan.

Continuing Awareness-Raising, Capacity Building and promoting of the TIR.

Developing and updating the online monitoring system.



Thank you